

Nutrient Criteria Adoption Plan
Maine Department of Environmental Protection
February 1, 2002

Introduction - Prioritizing and Grouping Waters for Criteria Development

Waters in Maine have been prioritized for criteria development by degree of impact and sensitivity and degree of importance to the public. Nutrient enrichment has long been an acknowledged problem in Maine lakes, with tremendous public support for addressing the issue. More recent data indicate an increasing problem in rivers and streams, as well as problems in estuaries and wetlands. Maine's overall approach to nutrient criteria development follows the grouping of waters in Maine's water quality standards classification system: water quality standards are organized by type of waterbody (rivers and streams, lakes and ponds, estuarine and marine) and by designated use classification (within waterbody type). Maine may also decide to create additional subgroups of waterbody types by physical and/or biological characteristics. Maine's specific approaches to nutrient criteria development vary by waterbody type, and are described in the separate sections below devoted to lakes, rivers and streams, wetlands, and estuaries.

Coordination with Regional Technical Assistance Group/Integrate with adjacent States

Maine DEP staff have been participating and will continue to participate in Regional Technical assistance Group (RTAG) meetings, conference calls, and workshops related to nutrient criteria development to stay informed of current technical issues, and to share Maine's data and expertise. The EPA Region 1/NEIWPCC RTAG has already benefited from Maine's considerable lake database, and has had at least one presentation by ME DEP staff on the development and implementation of lakes-based nutrient criteria. Continued participation in the RTAG will provide Maine the opportunity to share information and exchange administrative concerns with neighboring states. Maine intends to share a draft of this plan with the neighboring State of New Hampshire at the same time the plan is submitted to EPA Region I for review. ME DEP will forward future updates on nutrient criteria development to NEIWPCC for distribution to the RTAG group.

ME DEP staff also actively participate in regional environmental professional organizations such as the New England Association of environmental Biologists, the New England Chapter of the North American Lake Management Society, and the Atlantic International Chapter of the American Fisheries

Society. Attendance at the meetings sponsored by these organizations affords the opportunity for additional exchange of information related to nutrient issues.

Critical Decision-Makers

Critical decisions related to the development, adoption, and implementation of nutrient criteria in Maine will involve the Maine DEP Commissioner, Bureau and Division Directors, Maine Board of Environmental Protection, Land and Water Resources Council (State Planning Office), Maine Legislature (Natural Resources Committee), and Maine's Attorney General's Office.

Public Participation and Stakeholder Involvement

ME DEP will solicit public participation for rulemaking and statutory changes through public meetings of the Board of Environmental Protection and public hearings, as needed. DEP may also convene stakeholder groups to involve interested parties in addressing major issues which may arise.

LAKES

(Maine's Existing Allowable Numerical Incremental Change-Based Methodology)

Existing Approach to Nutrient Criteria Development & Implementation

Maine DEP's current and past approach to lakes nutrient criteria development and implementation is geared toward lake protection and conservation on a state-wide basis, through the effective control of nonpoint sources of pollution from human developmental pressures within lake watersheds. This can be considered a "designated use" approach, designed to implement existing narrative water quality standards for lakes with a translator procedure (EPA's Technical Guidance Manual 2000) involving acceptable (non-polluting) increases in phosphorus loading to lakes. Maine has evaluated site-specific lake data, and has determined that designated uses will be protected for all categories of lakes, provided that increases in total phosphorus levels do not exceed certain threshold levels. This "non-degradation" approach fully reflects localized conditions and protects specific designated uses - which is EPA's preference, given their three recommended approaches to nutrient criteria development.

Relationship of Nutrient Criteria to Water Use Classification

The current water use classification system in Maine has a single GPA classification for all Great Ponds, as well as natural lakes and ponds less than 10 acres in size. This GPA water use classification also includes some impoundments of rivers that are defined as great ponds. The-GPA narrative water quality standard requires "a stable or decreasing trophic state (based on measures of chlorophyll a content, Secchi disk transparency, total phosphorus content, and other appropriate criteria), subject only to natural fluctuations and freedom from culturally induced (nuisance) algal blooms which impair their use and enjoyment." [MRSA Title 38 §465-A]

Within the lakes context of numerical (incremental) nutrient criteria development in Maine, it is important to note that new direct pollutant discharges are not allowed into Class GPA waters, so nonpoint sources are the primary sources of nutrient enrichment. Any point source discharges licensed prior to January 1, 1986 are allowed to continue only until practical alternatives exist (there are only a few of these remaining in Maine). Also, no change of land use in the watershed may, by itself or in combination with other activities, cause water quality degradation that would impair the characteristics and designated uses or cause an increase in the trophic state of GPA waters.

The basis for Maine DEP's lake nutrient criteria methodology is the recognition of stable or decreasing trophic state for any given lake statewide - recognizing that minor increases in phosphorus levels may

occur without any violation in water quality standards (i.e., increased trophic state). The incremental total phosphorus concentration criteria is not used to determine if a lake is attaining the narrative stable or decreasing trophic state water quality standard. Trend analysis using a variety of in-lake trophic parameters (e.g., transparency, chlorophyll-a, dissolved oxygen profiles), which are more sensitive and robust than phosphorus measures alone, are used to determine violations in lake water quality standards. The incremental phosphorus criteria methodology is rather used to manage new non-point (watershed) total phosphorus loadings to lakes in order to avoid any perceivable increase in lake trophic state.

Although Maine DEP's water quality standards and classification system recognizes only one lake class (GPA), Maine DEP has examined state-wide data for transparency, phosphorus, chl-a, color, summertime dissolved oxygen levels, and seasonal fluctuations in algal and nutrient levels to determine lake sensitivity to additional loadings of total phosphorus. Maine DEP has subsequently established five categories of water quality for Maine lakes based on this analysis (See table below taken from Appendix C on page 105 of *Phosphorus Control in Lake Watersheds: A Technical Guide to Evaluating New Development*, Dennis et al., Maine-DEP, revised 1992).

Water Quality Category	Secchi Disk (feet)	Chlorophyll <u>a</u> (ppb)	Phosphorus (ppb)	Algal Bloom Risk and Comments
Outstanding	>30	≤ 2	2 - 5	Exceptional water quality. Very clear lakes with low algae levels and very low phosphorus concentrations. Rare and unique aquatic resources which are particularly sensitive to small increases in phosphorus.
Good	20 - 30	2 - 4	5 - 10	Generally clear lakes with relatively low algae and phosphorus levels. Fairly common type for larger lakes.
Moderate/ Stable	10 - 20	4 - 6	10 - 15	Less clear lakes which do not have summer algae blooms. Moderate algal and phosphorus levels. Not at high risk; stable algal and nutrient levels with little seasonal variation.
Moderate/ Sensitive	6 - 10	6 - 8	15 - 20	Lakes with similar water quality as above, but have high potential for developing algae blooms due to: significant declines in dissolved oxygen levels and/or large seasonal algal & nutrient level fluctuation.
Poor/ Restorable	<6	>8	>20	Lakes usually supporting nuisance summer algal blooms which receive conservative treatment to increase the feasibility for restoration.

Accordingly, Maine DEP has established a range of acceptable increases in lake phosphorus concentration (ppb) for each water quality category, in order to define the level of increased phosphorus concentration that would not risk a perceivable increase in lake trophic state and hence, a violation of narrative water quality standards. Table 3-2 (page 11) from the Maine DEP 1992 lake watershed phosphorus control technical guide (see below) represents the translator process between the narrative water quality standards and the acceptable increase in phosphorus concentration - viewed as a surrogate ~~numeric~~ nutrient criteria or control parameter. Phosphorus control is more stringent (lower acceptable increase) for sensitive waters (“outstanding” and “moderate/sensitive”) which would tend to respond much more dramatically to any given increase in total phosphorus than a “good” or “moderate/stable” lake.

Acceptable Increase in Lake Phosphorus Concentration (ppb)		
Water Quality Category	Lake Protection Level	
	High	Medium
Outstanding	0.5	1.0
Good	1.0	1.5
Moderate/Stable	1.0	1.25
Moderate/Sensitive	0.75	1.0
Poor/Restorable	0.2-0.5	

NOTE: A high level of protection is assigned to public water supplies and coldwater fisheries. All other lakes are assigned a medium level of protection.

Maine DEP Phosphorus Control Methodology in Lake Watersheds

The lake watershed phosphorus control evaluation process now in place enables local town planning boards to use specific information provided by Maine DEP to select an acceptable water quality goal or lake protection level (high to low) for any given lake. Subsequently, total phosphorus allocations are calculated for any new developments within the lake watershed, through site plan reviews under local town land use or subdivision ordinances and Maine DEP's Stormwater Management Law.

The top three ("outstanding, good, moderate/stable") categories of lakes definitely meet the Maine DEP narrative water quality standard of freedom from nuisance algal blooms. The fourth category (moderate/sensitive) of lakes are generally, but not always algal bloom free, while the fifth category ("poor/restorable") includes lakes which usually do not meet the freedom from algal bloom criteria. For lakes not attaining water quality standards, Maine-DEP calculates a lake-specific target total phosphorus concentration as part of a TMDL. The numeric phosphorus target concentration for an impaired lake is selected using best professional judgement based on a review of statewide water quality data for lakes taking into consideration available lake-specific water quality data and the water quality goals of Maine DEP. Lakes water quality data reviewed include average epilimnion grab/core samples corresponding to non-bloom conditions, as reflected in measures of Secchi disk transparency (> 2.0 m) and chlorophyll-a (< 8.0 ppb).

The incremental numeric lake nutrient criteria approach applies to all Maine lakes and effectively supports current water use classification and existing narrative lake water quality standards. Currently,

however, the lake watershed phosphorus control process is applied by towns on a voluntary basis in lake watersheds, except for site development covered by Maine's Stormwater Management Law. Under local town subdivision laws, local communities in Maine are required (in all organized towns statewide) to recognize and address potential phosphorus impacts (in-lake and watershed) and encouraged to incorporate specific water quality protection measures into local permits for implementation of lake water quality goals. For watersheds designated "most at risk", Maine DEP's existing stormwater management law provides developers design options along with phosphorus allocation rates. Limitations of existing laws include: developmental size thresholds for applicability (e.g., Town of China - single family, Town of Manchester - multi-home and commercial developments) and direct application to new construction sites only (but could be applied to other 'new' phosphorus sources).

Data Sources Supporting Lakes Nutrient Criteria Development

Maine DEP has an extensive and comprehensive statewide lake water quality data base, dating back to the 1970's, with over 1,000 lakes sampled. Maine DEP also conducts routine lakes baseline monitoring of 120 lakes on an annual basis. A large number of these lakes are specifically chosen (non-probabilistically)-to refine Maine water quality categories on a statewide basis. Currently, there are no plans, or perceived needs, for the collection of any additional field data to support the existing lakes nutrient criteria implementation process.

Data Analysis

Data have already been and will continue to be analyzed to evaluate lake potential for internal phosphorus recycling, dissolved oxygen depletion rates, coldwater fishery impacts, and assigning waterbody sensitivity ratings. Data are also analyzed from the perspective of specific high value water resources, such as public water supplies and coldwater fisheries. Water quality categories inclusion for individual lakes in Maine may be modified as a result.

Outside Expertise and Peer Review

Past and current scientific review of Maine's lake nutrient criteria development and implementation has occurred through presentations at NALMS (North American Lakes Management Society) meetings, at RTAG meetings, and through periodic (in-house) peer group reviews, involving engineers, biologists, and lake managers. Peer review of the lakes nutrient criteria methodology, as currently applied, is an ongoing process.

Administrative Procedures

Numerical-based (incremental) total phosphorus nutrient criteria have already been adopted (via the site location process and Stormwater Management Law) and are currently being implemented within lake watersheds in Maine on the basis of assigned water quality categories.

Major Milestones and Schedule for Lakes Nutrient Criteria Adoption

Maine lakes are classified statewide based on existing/historical information, but are subject to change and/or modification pending new information. Hence, the completion and refinement of water quality category designations and the adoption/implementation of nutrient criteria for Maine lakes is an ongoing process.

RIVERS & STREAMS

Approach

Maine plans to develop nutrient criteria for rivers and streams that will detect cultural eutrophication as a result of increases in nutrient loading. Maine DEP will use scientifically defensible methods to develop nutrient criteria suitable to protect designated uses. Maine DEP will also investigate the use of chemical nutrient concentration thresholds identified in the EPA's Nutrient Criteria Guidance Documents for Rivers & Streams in Ecoregions VII and XIV. The wide range of spatial and temporal nutrient conditions inherent to flowing waters means that a single indicator or measurement does not always represent ambient conditions. The approaches being considered include a combination of the following: vegetative productivity indicators, biochemical indicators, chemical nutrient concentrations, and human aesthetic standards. Vegetative productivity is an integrated response to nutrient inputs in conjunction with geography, flow and light conditions. This means that flow conditions (slow versus fast) and other logical variables that result in distinct community responses will be used to stratify the proposed approaches.

Relationship to Water Use Classification

Maine has a well defined stream and river classification system as defined in Maine's Water Classification Program, Maine Revised Statutes, Title 38, Article 4-A. This statute states, '...that it is the State's objective to restore and maintain the chemical, physical and biological integrity of the State's waters...'. Flowing freshwaters are protected by a system of four classes (AA, A, B, C) that are characterized by naturally occurring conditions and a set of regressive standards for dissolved oxygen, bacteria, and aquatic life. This system was developed to preserve the natural conditions of relatively undisturbed waters and maintain the biological integrity of waters in culturally developed watersheds. Maine will consider fitting nutrient criteria for rivers and streams into this existing classification system. In accordance with this system, nutrient criteria will be developed for unimpacted waters and waters that have anthropogenic influences that range from licensed discharges to nonpoint sources of pollution.

Coordination with Regional Technical Assistance Group/ Integrate with Adjacent States

Maine DEP staff will participate in Regional Technical Assistance Group meetings, conference calls and workshops related to nutrient criteria development to stay informed of current technical issues. Participation in the RTAG should provide Maine the opportunity to share information and exchange administrative concerns with neighboring states. Maine DEP staff also actively participates in regional

environmental professional organizations such as the New England Association of Environmental Biologists, the New England Chapter of the North American Lake Management Society and the Atlantic International Chapter of the American Fisheries Society. Attendance at the meetings sponsored by these organizations affords the opportunity for additional exchange of information related to nutrient issues.

Data Sources and Needs

Nutrient data in Maine's rivers and streams is limited since numerical criteria for water quality classification are determined by dissolved oxygen, bacteria and macroinvertebrate community structure. These parameters represent the majority of past data collection efforts, since they legally define the classification system. Phosphorus data have been collected incidentally during sampling programs designed to determine the impact of point source discharges and develop TMDL's. These sampling efforts should be expanded to better define the relationship between phosphorus concentrations and other measures of degradation, such as dissolved oxygen or aquatic life. High phosphorus concentrations in the water column have been connected to low dissolved oxygen, but studies have also found low phosphorus concentrations in flowing waters with obvious signs of enrichment, such as heavy densities of macrophytes and attached plankton. In these systems it is hypothesized that phosphorus is rapidly taken up by vegetation, leaving low concentrations in the water column. Vegetative growth during the summer may mask nutrient inputs and contribute towards the variability found in phosphorus concentrations in rivers. High phosphorus concentrations usually indicate a nutrient related problem, conversely low phosphorus concentrations do not necessarily exclude nutrient problems. Additionally, the majority of phosphorus data in Maine has been collected on culturally influenced systems and little data exists that characterizes unimpaired systems or reference conditions.

A surge in phosphorus concentrations during storm water runoff events is observed in both undisturbed and disturbed watersheds. The variability in phosphorus concentrations in flowing systems may result not only from cultural enrichment, but also from instream vegetative growth, storm water runoff and geographic factors like soils and slopes. There is a lack of widespread sampling data to adequately characterize the range of phosphorus concentrations found in Maine, from relatively undisturbed systems and those dominated by non point source pollution.

Maine DEP will develop specific approaches to gauge the impact of nutrient enrichment on established designated uses. To accomplish this objective, Maine DEP seeks to establish the connection between nutrient enrichment, dissolved oxygen and a symptom of enrichment (excessive growth in algal communities). This will require continuing and expanding Maine DEP's recently initiated periphyton-sampling program. Ideally, the issue of how nutrients and vegetative growth interfere with designated uses will be explored by gauging human perception of stream quality (odor and vegetation density).

Data Analysis

As part of the nutrient criteria development process, Maine DEP will continue to review various available data analysis methods that cover sampling instream algal communities. Sources may include the scientific literature, EPA and other agency technical guidance documents and DEP staff expertise. The study of human perception will require finding collaborators with expertise in studying the human dimensions in natural resources and developing protocols and methods.

Outside Expertise and Peer Review

Maine DEP currently uses outside expertise for taxonomic identification of biological samples and laboratory analyses of water samples. Maine DEP is also working with Dr. Jan Stevenson of Michigan State University to develop algal methods and indicators to stream quality based on periphyton sampling. As the studies connecting nutrients and algal communities in streams develops the work will be presented at professional meetings such as, the New England Association of Environmental Biologists.

Staffing and Resource Needs

In order to develop and implement nutrient criteria for freshwater streams and rivers by 2004, Maine DEP will need additional resources to complete the studies on algal communities, characterize reference conditions and initiate the study on human perception. It is estimated that DEP will need two additional seasonal field staff to conduct expanded nutrient, periphyton and dissolved oxygen sampling. To accomplish project objectives additional support for laboratory analyses, taxonomic contracts, equipment, supplies, and travel will be needed. The study of human perception will require identifying funding sources to underwrite the project.

Administrative Procedures for Implementation

After the Maine DEP determines the best technical approach to nutrient criteria, then DEP would probably incorporate the approach into the existing stream and river classification system. Alternatively, nutrient criteria may also be used to add an anti-degradation standard to the current classification system. Once the nutrient criteria becomes part of Maine's Water Classification Program, then it will be another set of standards used to evaluate the whether a stream or river meets classification. Water bodies that violate classification are then subject to additional Department scrutiny and eligible for restoration efforts.

Public Participation and Stakeholder Involvement

Maine DEP will solicit public participation for rulemaking and statutory changes through public meetings of the Board of Environmental Protection and public hearings as needed. Maine DEP may also convene a stakeholders group to involve interested parties in addressing major issues, which arise.

Major Milestones and Schedule for Completion

Major milestones will include: 1) testing of algal, dissolved oxygen and vegetative indicators to assess nutrient enrichment, 2) initiate and complete a study on the human perception of stream quality, 3) development of impairment thresholds for vegetative and/or chemical nutrient criteria, 4) update Maine's Water Classification Program. The schedule for completion is not firm, as this work cannot be accomplished without adequate additional positions and funding. It is anticipated that the necessary phosphorus and algal samples will be collected during the 2002 and 2003 field seasons and the study of human perception will be initiated in 2002 and conducted sometime in 2003. Adoption of nutrient criteria by the target date of 2004 will depend on the progress and results of ongoing studies.

WETLANDS

Approach

Due to the range of natural conditions inherent to wetlands, including wide spatial and temporal variability in nutrient concentrations, Maine plans to develop nutrient criteria based on biological response indicators. Approaches being considered include the use of algal and vegetative indicators of wetland nutrient enrichment (community composition, productivity, etc). These approaches are presented in EPA's "Methods for Evaluating Wetland Condition" Modules (DRAFT EPA 843-B-00-002, May 2001). Maine DEP is currently participating in a cooperative project with Michigan State University to develop algal assessment methods for wetlands. Maine DEP will also investigate the use of chemical nutrient concentration thresholds as appropriate for specific wetland classes.

Relationship to Water Use Classification

The current use classification system in Maine needs legal clarification with respect to wetlands. Although Maine does not have wetland-specific water quality standards, existing uses and criteria for fresh surface waters and estuarine and marine waters may be applicable to wetlands as an interim measure. This approach has been used by other states and by some Department programs, but has not been consistently applied in Maine. Biological impairment thresholds developed for nutrients will be tied to existing use classes, if it is determined that these classes are applicable to wetlands. Otherwise, new classes will need to be defined and adopted into law. The long-term goal for Maine is to develop wetland-specific uses and criteria.

Wetland Classification

Maine DEP will consider and/or test various a priori classification systems, including Cowardin, US Fish and Wildlife Service (hydrogeomorphic-type), and Maine Natural Areas Program classifications. Maine DEP may modify or combine classification approaches based on analysis of monitoring data, and will also examine differences among wetlands on a regional basis to determine the applicability of ecoregional classes.

Data Sources and Needs

Existing data for Maine wetlands is limited. Maine DEP is currently developing a wetland biological assessment program, and has collected physical, chemical and biological data (including nutrients, macroinvertebrates, and algae) for freshwater wetlands in portions of southern Maine. Maine DEP plans to monitor the remainder of the state using a five-year rotating basin approach, provided adequate funding levels can be maintained. Although vegetative indicators will likely be important for assessing wetland trophic status, DEP does not currently have staff resources to monitor vascular plant assemblages or measures of productivity. Maine DEP will coordinate with other agencies and organizations, including the Wells National Estuarine Reserve and Maine Natural Areas Program to assemble appropriate existing data, but will also need to collect additional statewide data for both freshwater and coastal wetlands.

Data Analysis

As part of the nutrient criteria development process, Maine DEP will review various available data analysis methods. Sources may include EPA and other agency technical guidance documents and the scientific literature.

Outside Expertise and Peer Review

Maine DEP currently uses outside expertise for taxonomic identification of biological samples and laboratory analyses of water samples. Maine DEP is also working with Dr. Jan Stevenson of Michigan State University to develop algal methods and indicators to assess wetland condition. DEP staff actively participate in EPA's national and regional Biological Assessment of Wetlands Workgroups (BAWWG and NEBAWWG), as well as relevant professional organizations. Work related to the Department's emerging wetland biological assessment program has been peer reviewed through presentations to BAWWG, NEBAWWG, the Society of Wetland Scientists, and the New England Association of Environmental Biologists. Maine DEP will also collaborate with other groups and agencies as appropriate, including the Wells National Estuarine Reserve, the U.S. Geological Survey, Maine Natural Areas Program, and the University of Maine.

Staffing and Resource Needs

In order to develop and implement nutrient criteria for freshwater and coastal wetlands by 2004, Maine DEP will need additional staff and resources. It is important to note that Maine's biological monitoring program does not currently include coastal wetlands, and that coastal wetlands are not addressed in the nutrient criteria development plan for estuaries. It is estimated that two additional full time biologists (one each for freshwater and coastal wetlands) and two seasonal field staff may be required. Maine DEP faces significant obstacles to adequately staff this initiative, including obtaining stable multi-year funding for personnel. The Department has also had ongoing difficulty receiving authorization from the legislature to create and hire new positions, even if they are funded through federal sources. Other anticipated expenses include laboratory analyses, taxonomic contracts, equipment and supplies, and travel support.

Administrative Procedures for Implementation

Since the Maine use classification system will need to be clarified with respect to wetlands, it is uncertain at this time what administrative procedures will be necessary to implement wetland nutrient criteria. The first step will be to determine through the Office of the Maine Attorney General if existing uses may be applied to wetlands on an interim basis. Doing so will require Departmental policy changes to ensure consistent interpretation of Maine's water classification law among all wetland-related programs. Maine will also need to revise its regulations to document wetland monitoring and assessment methods and thresholds for impairment, which will be linked to nutrient criteria. Related statutes will also be reviewed to determine if any changes are necessary.

Major Milestones and Schedule for Completion

Major milestones will include clarification of the applicability of Maine's use classification system to wetlands, testing of algal and vegetative indicators to assess nutrient enrichment, and development of biological and/or chemical nutrient impairment thresholds and criteria linked to wetland use classes. The schedule for completion is currently uncertain, as this work cannot be accomplished without adequate additional positions and funding.

MARINE/ESTUARIES

Approach

Coastal marine nutrient criteria are less developed in Maine, than criteria for lakes and rivers and streams, but solid progress is being made within the data-gathering stage through the projects described below. Current data in Maine indicate that some small embayments with circulation issues may be experiencing depressed dissolved oxygen levels due to nitrogen inputs. Maine DEP will need to examine the sources of nitrogen, since some come from offshore, i.e. the Labrador current and the Gulf Stream. Maine may also have to group marine waters based on physical characteristics because of these offshore sources. For example, nitrogen is probably is not the limiting nutrient in areas of upwelling, such as the Maine coastal current (Downeast).

Relationship to Water Use Classification

The current water use classification system in Maine has three tiers for marine and estuarine waters: SA, SB, and SC, with all three meeting the fishable/swimmable goals of the Clean Water Act. All three classes contain narrative biological standards as well as criteria for dissolved oxygen and bacteria. Maine's coastal monitoring is attempting to gather data on nutrients in both the water column and sediments, as well as benthic community structure to further the goal of using biocriteria to manage Maine's coastal waters.

National Coastal Assessment Project

The State of Maine Partners have and will continue to participate with US EPA in the National Coastal Assessment Project, formerly known as "Coastal 2000". Maine State Partners include the ME DEP, the Coastal Program of the Maine State Planning Office, the Department of Marine Resources (DMR), and the Casco Bay Estuary Project (CBEP). The shared goals include uniform assessment and condition of coastal resources, implementation of state-wide coastal monitoring strategies, definition of ambient conditions for coastal waters, and support for the development of biocriteria. Estuarine monitoring under this program has a probability-based sampling design for approximately 70 stations along the coast of Maine. Sampling occurred between early July and mid-September for 2000 - 2001, and more work is scheduled for 2002 and beyond. Many different indicators of water quality (DO, salinity, temperature, depth, nutrients, chlorophyll-a), sediment quality, and biota (benthic and fish community structures, fish external pathology and tissue analysis) are measured using methods developed by EMAP during the past 10 years. It is recognized that a small number of stations will be

used to represent a 5,296-mile coastline, and that annual differences in temperature, pulse storm events, etc. are important factors affecting the marine ecosystem.

Reference Conditions Project

Maine DEP is coordinating with EPA National Nutrient Criteria Program on the 2001-2002 reference condition development project. Maine DEP, in cooperation with EPA, is in the process of selecting a set of candidate reference sites within Maine's coastal waters, including sites reflecting both minimal human use and developmental impacts. Sampling of up to fifty stations is scheduled during the spring and summer of 2002. Collected samples will be analyzed for TN, TP, chlorophyll-a, and Secchi depth in addition to standard CTD (conductance, temperature, depth) probe readings.